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Underwriting Gain in Managed Medicaid: Starting the Conversation

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For managed care organizations (MCOs) serving Medicaid populations, underwriting gain is a regulatory requirement[1] and a broadly accepted component of capitation rates. However, the capitation rate development processes, as documented in various actuarial rate certifications and memoranda, usually contain little to no details on the derivation of the underwriting gain assumption. Further, actuarial publications pertaining to Medicaid managed care rate development do not specify the calculation techniques that should be used to develop underwriting gain.

According to the Actuarial Standards Board's Actuarial Standard of Practice No. 49 (ASOP 49), actuarially sound capitation rates will include a provision for underwriting gain in order to provide compensation for the risks assumed by an MCO.[2] However, there is no generally accepted method for quantifying underwriting gain in managed Medicaid capitation rates. To begin to address this void, we developed a model to calculate underwriting gain. The model was developed by researching existing financial literature and performing a statistical analysis of industry data to build out a framework that can be leveraged to estimate underwriting gain.

The methodology outlined here may serve as a starting point for actuaries to determine the appropriate level of underwriting gain for a particular Medicaid program. Further details and an accompanying model that can be used to estimate underwriting gain can be found on the Medicaid Health Plans of America (MHPA) publications page.[3]

WHAT IS UNDERWRITING GAIN?

The primary actuarial guidance on developing managed Medicaid capitation rates is ASOP 49, which states that underwriting gain provides compensation for the risks assumed by an MCO and is comprised of two components:[4]

- Cost of capital
- Margin for risk or contingency

The cost-of-capital component of underwriting gain essentially pays shareholders, investors and lenders for the use of funds invested in a Medicaid product. MCOs are required by states to hold capital in support of their Medicaid business to meet obligations and ensure solvency of the organization. The cost of capital is the cost of setting aside such funds.

Margin for risk or contingency, commonly referred to as risk margin, is needed in capitation rate development to account for the program risks. Risk margin is quantified by calculating the likelihood that actual experience will deviate adversely from projected experience. Actual experience may deviate from expectations for various reasons such as the actual medical cost trend exceeding the assumed trend rates, an inability to accurately predict the impact of program and policy changes, or limitations of risk-adjustment mechanisms to sufficiently predict costs.

WHY IS UNDERWRITING GAIN NECESSARY?

Of chief importance, ASOP 49 requires that capitation rates include a provision for underwriting gain to provide for the risks assumed by the MCO.[5] This includes providing for cost of capital, but there are also other considerations that establish the need for underwriting gain in Medicaid capitation rates.

Medicaid managed care is unique from other health insurance in that the entity setting the capitation rates (price) is not usually the entity bearing the mispricing risk. Since the rate-setting actuaries do not bear the financial risk of mispricing, they do not have the same economic incentive to include margins for deviation as does a pricing actuary working in other lines of health insurance. Since Medicaid MCOs rely on the state's actuary to develop capitation rates at levels that adequately fund the program, even in years of adverse deviation, explicit inclusion of an adequate risk margin in the capitation rates is especially important.

Another unique aspect of Medicaid capitation rate setting is that the state actuary often develops rates for the program overall, rather than for each specific MCO, using the combined experience of all MCOs in the program. This further increases the risk that the rates for any one MCO within the program may not be adequate. Not only will actual results vary from expected results

for the entire Medicaid program, but results will vary by each individual MCO. Some of the variation is due to factors that generally exist across all types of health insurance and are outside the MCOs' control, such as anti-selection or the inability of risk-adjustment mechanisms to fully capture membership risk, which further supports the need to include risk margin.

Finally, it is common to think of the underwriting gain components in the capitation rates as being equal to the expected MCO net income. However, Medicaid programs have changed such that there are now common limitations in Medicaid contracts (e.g., risk sharing and withholds) which cause the amount of underwriting gain in the rates to not result in the MCO percentage of net income. Therefore, a more precise analysis is required to determine an appropriate underwriting gain assumption.

COMPONENTS OF UNDERWRITING GAIN: COST OF CAPITAL

As mentioned previously, cost of capital is an MCO's cost of setting aside capital in support of its Medicaid business. Companies can raise capital to fund investments into business ventures by issuing debt (e.g., bonds or loans) and/or equity (e.g., stock). The total cost of these financial instruments is called the cost of capital.

MCO investments in managed Medicaid contracts are the funds the MCO holds in reserve as risk-based capital (RBC)[6] or other equity requirements imposed by the state and any additional funds that must be invested in the program if the revenues from the contract are less than the expenses of the contract. These are the amounts on which the MCO expects to earn a return.

The most common approach to calculating the cost of capital is to use the weighted average cost of capital (WACC). Under this method, all sources of financing—equity and debt—are included in the calculation and each source is given a weight commensurate with its proportion in the company's capital structure.[7] The following formula can be used to determine WACC:

WACC =
Cost of Equity × Weight of Equity + Cost of Debt × Weight of Debt

Typically, in the context of corporate financing, the WACC is reported on an after-tax basis. However, since the underwriting gain capitation rate component must be developed on a before-tax basis, the formula must be altered from the normal formula to produce a before-tax percentage. This is done by grossing up the cost of equity for taxes before blending it with the before-tax cost of debt.

The components of WACC are:

- **The cost of debt.** This can be determined by dividing the total interest a company is paying on debts by those debts.
- **The cost of equity.** This is the expected rate of return for the company's shareholders and can be quantified by calculating the stock's expected return, including consideration for volatility, grossed up to a before-tax basis. The following formula can be used to determine the cost of equity:

  Cost of Equity =
  $$\frac{\text{Equity Risk Premium} \times \text{Beta} + \text{Risk-Free Rate}}{\text{(After-Tax Yield)}}$$
  where

  Equity Risk Premium =
  Market Expected Return Rate – Risk-Free Rate

  and

  After-Tax Yield =
  1 – [Federal Tax Rate + State Tax Rate × (1 – Federal Tax Rate)]

  Equity risk premium is the difference between the stock's expected return and the risk-free rate. The market expected return rates for stock companies can be found using sources such as Pimco,[8] Voya[9] and Bloomberg.[10] The risk-free rate is commonly represented by the U.S. Treasury rate, which can be found on the U.S. Treasury site.[11] Beta is a measure of a stock's volatility of returns relative to the entire market index, such as the S&P 500. A beta greater than one means that the stock is potentially more volatile than the market and has unsystematic risk. A stock company's historical beta can be found on the Bloomberg website.[12] The after-tax yield formula assumes that the federal tax is deductible from the state tax calculation.

Once the WACC is determined, it can be used to develop the cost-of-capital assumption for the underwriting gain used in the managed Medicaid capitation rates.

To determine the amounts of capital on which to apply the WACC, the actuary must estimate the amount of capital held in reserves to support the Medicaid business. This includes capital held in reserves as RBC and other forms of equity held as required by the Medicaid contract or state regulatory agencies. To determine the amount of cost of capital needed in the capitation rates, the actuary should estimate the ratio of the capital held to the premium, which will be referenced as the RBC/equity ratio. The load to include in the capitation rates for cost of capital can then be expressed as:

Cost of Capital = RBC/Equity Ratio × WACC

The RBC/equity ratio should be based on all capital investments of the MCO, not just the minimum required by statute. MCOs typically hold more than the minimum capital requirements for multiple reasons such as the chance of a loss in a particular year, late payment of capitation rates and industry expectations. Hold-

ing RBC/equity levels at more than what is statutorily required reduces the risk of default and leads to a lower cost of debt, which offsets the cost of holding the higher level of reserves.

Table 1 is an illustrative example of how cost of capital may be calculated, beginning with the calculation of WACC.

Table 1
Assumptions Used in WACC Calculation

Assumptions	Percents
Risk-free rate	2.8%
Market expected return	13.2%
Beta	0.94%
Cost of debt (borrowing rate)	5%
Debt as a percent of total	20%
Federal tax rate	21%
State tax rate	5%

WACC Calculation Example

With the numbers assumed in Table 1, we can now calculate WACC.

Equity Risk Premium
= Market Expected Return Rate – Risk-Free Rate
= 13.2% – 2.8% = **10.4%**

After-Tax Yield
= 1 – [Federal Tax Rate + State Tax Rate × (1 – Federal Tax Rate)]
= 1 – [21% + 5% × (1 – 21%)] = **0.751**

Cost of Equity

$$= \frac{\text{Equity Risk Premium} \times \text{Beta} + \text{Risk-Free Rate}}{\text{After-Tax Yield}}$$

$$= \frac{10.4\% \times 0.94 + 2.8\%}{0.751} = \mathbf{16.8\%}$$

WACC
= Cost of Equity × Weight of Equity + Cost of Debt × Weight of Debt
= 16.8% × 80% + 5.0% × 20% = **14.4%**

Cost-of-Capital Calculation Example

Once the WACC is developed, the cost of capital can be calculated. Table 2 is an example of the calculation of the cost of capital where MCOs hold on average 350 percent of RBC and 100 percent of RBC equates to approximately 4 percent of revenue.

Table 2
Assumptions Used in Cost-of-Capital Calculation

Assumptions	Percents
RBC/equity MCOs hold	350%
100% RBC/equity ratio	4.0%
WACC	14.4%

In this example, 2.02 percent is the before-tax cost of capital, as a percentage of revenue, to use in the underwriting gain assumption:

Cost of Capital
= (Required Capital × 100% of RBC as a Percent of Revenue) × WACC
= RBC/Equity Ratio × WACC
= (350% × 4.0%) × 14.4%
= 14.0% × 14.4% = **2.02%**

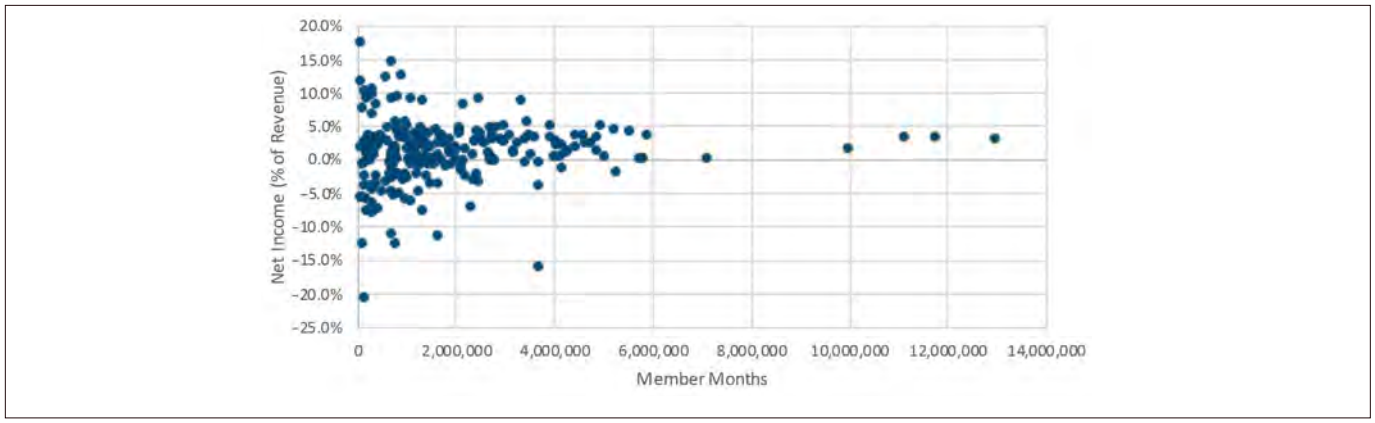
COMPONENTS OF UNDERWRITING GAIN: RISK MARGIN

Risk margin, the second component of underwriting gain, is needed in capitation rate development to account for the program risks. It is quantified by calculating the likelihood that actual experience will deviate adversely from projected experience.

In practice areas other than Medicaid, premium rates are often developed using pricing assumptions that include implicit margin. This implicit margin offsets risk associated with adverse deviation. The Center for Medicare & Medicaid Services (CMS) provides guidance on Medicaid managed care rate setting that can be interpreted to limit the use of implicit margin in the pricing assumptions; therefore, in Medicaid capitation rate development, an explicit risk margin should be included as a separate component of the underwriting gain assumption.

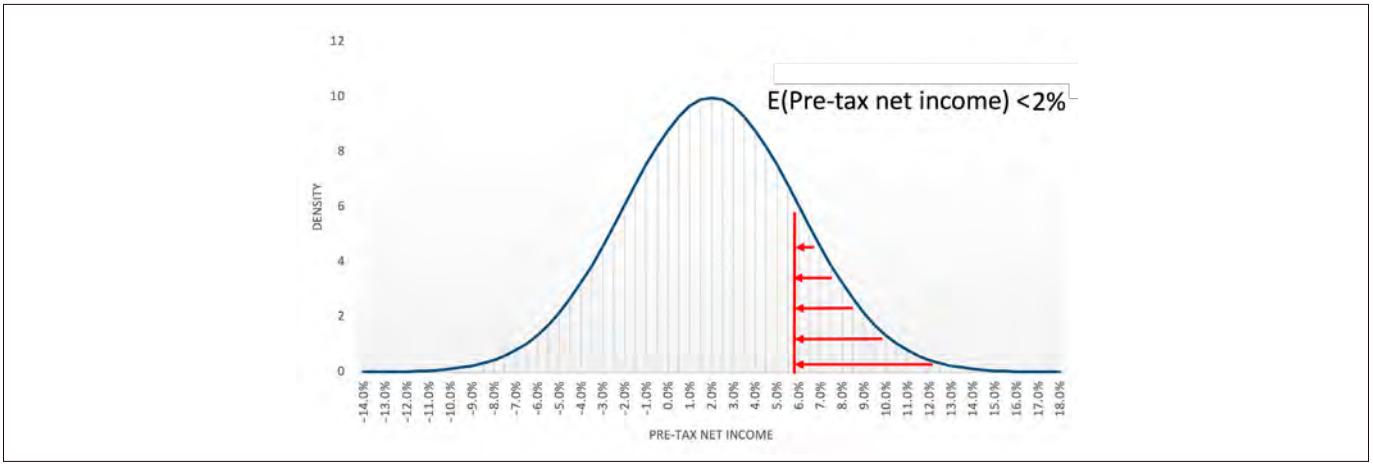
While there is no direct formula for risk margin that captures the unique risks of a given Medicaid program, historical financial experience in the Medicaid MCO industry can be used to determine an appropriate risk margin. An example of Medicaid MCO financial experience of net income by MCO member size is shown in Figure 1. Such experience can be used to develop a statistical model that estimates probabilities of future financial results, while taking into account the unique design of a given Medicaid program.

Figure 1
MCO Net Income as a Percent of Revenue Versus Enrollment, 2013–2015



Source: Gibson, Sabrina H., James R. Piekut and Jaredd Simons. 2019. Underwriting Gain Development for Managed Medicaid Capitation Rates. Medicaid Health Plans of America (MHPA). *https://www.medicaidplans.org/_docs/MHPA_Underwriting_Gain_Development_Report_June_2019_FINAL.pdf.*

Figure 2
Pre-Tax Net Income Distribution



Note: μ = 2%; σ = 4%; Max PTNI = 6%

As mentioned earlier, the underwriting gain assumption may be thought of as being analogous to expected MCO net income, however, Medicaid programs have changed such that there are now common limitations in Medicaid contracts which cause the amount of underwriting gain in the rates to differ from the expected MCO percentage of net income. These include:

- **Risk-sharing** provisions that limit profit or losses and often create an asymmetry in the distribution of gains and losses for an MCO and for the Medicaid program. Minimum MLRs and other risk-sharing remittance requirements limit MCO profits and the state's exposure to overpricing risk. Minimum MLR remittance has become a common element of Medicaid managed care contracts. Maximum MLRs, which are less common than minimums, protect the MCOs from specified levels of loss. Minimum MLRs increase the level of risk margin required, while maximum MLRs reduce the level.
- **Withholds** from the capitation rates that are not expected to be earned back by the MCOs reduce the overall capitation received by an MCO. Lower capitation increases the probability of loss and lowers the expected net income. Additional risk margin is required to maintain the intended expected net income.

ASOP 49 requires the actuary to consider risk sharing and withholds when developing the underwriting gain. The impact of these provisions limits the potential gain and loss of any given MCO in the program. Figure 2 illustrates how these limitations can impact the expected pre-tax net income when the maximum profit is limited by program policy.

The underwriting gain model is a statistical model that determines the probability of an MCO achieving any given medical loss ratio between 50 percent and 150 percent based on the inputs into the model. The model further calculates the impact of program policies on the net income in each scenario to de-

termine the expected net income. As the risk margin changes, the premium changes, so the model calculates the risk margin through an iterative process.

One additional component should be considered as part of the underwriting gain—the cost-of-capital infusions. These infusions occur when an MCO experiences a loss. Losses incurred by an MCO are paid for with the capital reserves discussed earlier. Therefore, an MCO must raise additional capital to maintain the RBC/equity requirements. This additional capital, the infusion, is added to the cost of capital on the initial investment to determine the total cost-of-capital component. The model assumes this additional capital can be raised at the same WACC as the initial investment.

The final underwriting gain load in the rates is determined by summing the cost of capital and the risk margin with adjustments for withholds and risk sharing if needed.

DEVELOPMENT AND OPERATION OF THE MODEL

The model was developed in Microsoft Excel to perform the calculations needed to produce the underwriting gain for managed Medicaid capitation rates using the method described previously. This model and an accompanying report can be found on MHPA's publications page.[13] The model is open source, allowing users to modify the model as needed to align with the structure of any given Medicaid program. Users are urged to review the report and model in detail prior to making any modifications.

The model calculates the components of underwriting gain to achieve a target pre-tax net income set by an actuary. The model determines the cost of capital and risk margin components separately. Cost of capital is determined on the initial investment and the infusions separately.

The final underwriting gain load in the rates is determined by summing the cost of capital and the risk margin. Figure 3 is the summary output of an illustrative example. In this example, the pre-tax net income target was set to 2.0 percent. The cost of capital is 1.74 percent, the risk margin is 0.90 percent, and the cost-of-capital infusions is 0.06 percent, bringing the final underwriting gain to 2.70 percent. This means that for the given example, the actuary setting the capitation rates should consider including a 2.70 percent provision in the rates for underwriting gain to establish an assumption in the rates of an expected net income of 2.0 percent.

Figure 3
Summary Output of Illustrative Example From the Model

UW Gain (rate component) of 2.70% produces Expected Pre-Tax Net Income of 2.00%

UNDERWRITING (UW) GAIN	
Cost of Capital: Initial Investment	1.74%
Cost of Capital Infusions	0.06%
Margin for Risk & Contingency	0.90%
UW Gain	**2.70%**

EXPECTED PRE-TAX NET INCOME	
UW Gain (Rate Component)	2.70%
Less Withhold Not Achieved	–0.50%
Less Capital Infusions	–0.06%
Less MLR Cap(s)	–0.14%
Expected Net Income (Before Tax)	**2.00%**

STATISTICAL SUMMARY

Gain Interval	Probability
0–2%	24.2%
2–4%	25.2%
4–6%	16.9%
6–8%	10.3%
8–10%	0.0%
10+%	0.0%
Probability of Gain	**76.6%**
Expected Gain | Given Gain	**3.2%**

Loss Interval	Probability
0–2%	14.0%
2–4%	6.3%
4–6%	2.4%
6–8%	0.6%
8–10%	0.1%
10+%	0.0%
Probability of Loss	**23.4%**
Expected Loss | Given Loss	**–2.0%**

Ruin Loss Indicators	Probability
RBC/Equity reduced below min required	8.85%
RBC/Equity reduced below 200%	1.48%
Total Loss of RBC/Equity	0.00%

Actuarial judgment is required to adjust this result to take other factors into consideration that may not be as easily quantified, such as aggressiveness or conservatism of trend and other actuarial assumptions, maturity of the program, population or benefits, and volatility in the current health care environment. Applicable regulatory requirements should also be considered. The model summary provides additional statistics on the probability of gain or loss to aid the actuary in making these judgments.

CONCLUSION

Underwriting gain is a necessary component of managed Medicaid capitation rates. It ensures MCO solvency, stabilizes Medicaid financial results, provides market-required rates of return on capital invested in the Medicaid programs, and allows for choice among MCOs due to the availability of competition. Methods for developing the underwriting gain assumption have not historically been shared publicly so the concepts discussed here attempt to contribute to a discussion on this subject.

Changes in recent years to the contractual structure of Medicaid programs (e.g., withholds, risk sharing) require actuaries to reconsider prior approaches to setting underwriting gain assumptions. As Medicaid programs have evolved and begun limiting the potential gains or losses of the MCOs in the program, the actuary should use more rigorous approaches to determine the impact of these program requirements.

As the discussion on underwriting gain advances, the method presented here is an analytical, statistics-based starting point for actuaries to determine the appropriate level of underwriting gain for a particular Medicaid program. Wherever the discussion goes from here, the addition of data and analytics will help Medicaid actuaries live the creed emblazoned on many Fellow of the Society of Actuaries certificates: "The work of science is to substitute facts for appearances, and demonstrations for impressions."

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ENDNOTES

1 42 CFR 438.6 (a).

2 "The underwriting gain provision provides compensation for the risks assumed by the MCO." Actuarial Standards Board (ASB). 2015. Actuarial Standards of Practice (ASOP) No. 49: Medicaid Managed Care Capitation Rate Development and Certification, Section 3.2.12 b. *http://www.actuarialstandardsboard.org/wp-content/uploads/2015/03/asop049_179.pdf.*

3 Medicaid Health Plans of America (MHPA). Publications. *https://www.medicaidplans.org/communications/publications.* (Accessed Aug. 12, 2019.) See Gibson, Sabrina H., James R. Piekut and Jaredd Simons. 2019. Underwriting Gain Development for Managed Medicaid Capitation Rates. Medicaid Health Plans of America (MHPA). *https://www.medicaidplans.org/_docs/MHPA_Underwriting_Gain_Development_Report_June_2019_FINAL.pdf,* and accompanying Excel file.

4 ASB. ASOP 49.

5 Ibid., Section 3.2.12 b.

6 "Risk-based capital (RBC) is a method of measuring the minimum amount of capital appropriate for a reporting entity to support its overall business operations in consideration of its size and risk profile. RBC limits the amount of risk a company can take. It requires a company with a higher amount of risk to hold a higher amount of capital. Capital provides a cushion to a company against insolvency. RBC is intended to be a minimum regulatory capital standard and not necessarily the full amount of capital that an insurer would want to hold to meet its safety and competitive objectives." National Association of Insurance Commissioners (NAIC). Risk-Based Capital. *https://www.naic.org/cipr_topics/topic_risk_based_capital.htm.* (Accessed Feb. 3, 2019.)

7 CFI. What is Cost of Capital? *https://corporatefinanceinstitute.com/resources/knowledge/finance/cost-of-capital/.* (Accessed Dec. 2, 2018.)

8 *https://www.pimco.com/en-us/.*

9 *https://www.voya.com/.*

10 https://www.bloomberg.com/.

11 U.S. Department of the Treasury. Daily Treasury Yield Curves. *https://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield.*

12 *https://www.bloomberg.com/.*

13 Supra note 3